INTERGOVERNMENTAL SECRETARIAT TO THE ACTION COMMITTEE ON WESTERN CANADIAN LOW-SULPHUR COAL TO ONTARIO

2nd Floor, Pacific Plaza, 10909 Jasper Avenue, Edmonton, Alberta T5J 3M8 Telephone : (403) 427-3490

November 19, 1987

The Honourable D. Mazankowski,
Deputy Prime Minister
President of the Queen's Privy Council of Canada
and Government House Leader
The Honourable D. Peterson,
Premier of Ontario
The Honourable G. Devine,
Premier of Saskatchewan
The Honourable D. Getty,
Premier of Alberta
The Honourable W. Vander Zalm
Premier of British Columbia

This letter is sent to you in your capacity as Members of the Action Committee on Western Canadian Low-Sulphur Coal to Ontario.

The Intergovernmental Secretariat appointed by the Federal and Provincial governments to support the Action Committee has the honour to present its Report for your consideration.

The Secretariat notes that the initiatives recommended in this report address only a fraction of the potential domestic and international market opportunities for western Canadian coal. The Secretariat trusts, therefore, that the Action Committee will view this report and its recommendations in the light of the broader context and that consideration will continue to be given to those other activities necessary to ensure the role of coal in the economic base of western Canada, as outlined in the background paper "A Framework for Diversification in Western Canada", released by the Prime Minister on August 4, 1987.

Respectfully submitted,

"Dan McFadyen" "I. Bruce MacOdrum"

"G. Bruce McRae" "Ron R. Sully"

"Garnet T. Page"

Chairman : *Garnet T. Page, OC, Alberta Coal Development Advisor, Alberta Energy*
Members: *Ron R. Sully, Assistant Deputy Minister, Mineral Policy Sector, Energy, Mines and Resources Canada*
I.B. MacOdrum, Assistant Deputy Minister, Energy Policy and Planning, Ontario Ministry of Energy
D. McFadyen, Director, Technology Branch, Saskatchewan Energy and Mines
G. Bruce McRae, Acting Executive Director, British Columbia Ministry of Energy, Mines and Petroleum Resources

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REPORT TO THE ACTION COMMITTEE

The formation of the Action Committee on Western Canadian Low Sulphur Coal to Ontario was announced by the Deputy Prime Minister on March 11, 1987. Its members are:

Chairman:	Hon. D. Mazankowski, P.C., M.P. Deputy Prime Minister President of the Queen's Privy Council of Canada and Government House Leader
Vice Chairman:	Hon. D. Peterson, Premier of Ontario
Members:	Hon. G. Devine, Premier of Saskatchewan
	Hon. D. Getty, Premier of Alberta
	Hon. W. Vander Zalm, Premier of British Columbia

The Action Committee's objectives are to identify methods to improve the competitiveness of western Canadian coal for Ontario industry, to review all regulatory and fiscal aspects of transportation, and to pursue those product oriented research and development programs related to coal technologies.

The Action Committee is supported by an Intergovernmental Secretariat composed of one representative of each participating government. The Secretariat was assigned two primary functions by the Action Committee:

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a) to determine, from all relevant private sector interests, their views as to what actions, if any, governments could take to improve the competitive position of western coal in Ontario, and

b) to recommend how the governments could cooperate with each other and the private sector in pursuing those initiatives where collective action seemed desirable.

The Secretariat assumed the following principles.

1. Coal sales to Ontario must be made on a commercial basis.

2. Government actions to promote the western coal initiatives must complement private sector efforts and must be endorsed or supported by private sector interests.

3. In addition to cooperative initiatives to be undertaken collectively by the represented governments, individual governments may pursue initiatives of specific interest or relevance to their jurisdiction.

Background

The work of the Secretariat this year should be seen in an historical context which dates back to 1978. At that time Thunder Bay Terminals and rail and laker capacity were put in place, and Ontario Hydro began purchasing western Canadian coal in significant amounts. The contracted costs reflected the strong international coal market at that time.

In the early 1980s the downturn in coal markets and prices made Ontario Hydro's contracted costs for western Canadian coal higher than today's costs. In order to examine the opportunities for increased use of Alberta coal in Ontario, the Alberta and Ontario governments conducted a study in 1984 of Alberta coal to Ontario. During the same period, the United Mine Workers of America District #18, supported by some other unions and the civic officials of the western coal producing communities, began to press for government subsidies to support the increased use of western Canadian coal in Ontario in place of imported U.S.A. coals.

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A federal/provincial task force also examined the socio-economic costs and benefits of Ontario Hydro using more western Canadian coals. In 1986 the study recommended that in the light of the environmental, economic, employment and social benefits for Canada, governments should initiate a program with industry to find ways to lower the delivered costs of western Canadian coals to the Ontario market.

In mid-1987, Ontario Hydro had a shortfall of hydroelectric reserves and some U.S.A. coal, and as a result made spot purchases totalling 1 million short tons of western Canadian coal and up to 1.2 million short tons of U.S.A. coal. Ontario Hydro states that the delivered prices of the Canadian coals were competitive with U.S.A. coals. It is not certain whether these prices are sustainable into the 1990s.

The Ontario Government has informed Ontario Hydro that it must present an energy supply and emission controls plan by January, 1989 to meet Ontario's emission guidelines. Ontario Hydro's coal demand is expected to increase from a projected low of about 5.9 million tons in 1992 to a projected annual requirement within the broad range of from 5.1 to 11.9 million tons by 2000. There is a place in the plan for using significant quantities of low-sulphur Canadian coal, provided that the price does not make it uncompetitive with other options, and that the physical characteristics of the coal move closer to those of the reference U.S. coals for which the boilers were designed. Coals which do not conform to the reference coal specification may require the boilers to be modified. Western Canada must strive for as large a share of these amounts as possible.

Ontario Hydro's long term contracts for bituminous coals from Alberta and British Columbia terminate in 1992, while its long term contracts for lignite from Saskatchewan terminate in 1996. Direct negotiations between Ontario Hydro and interested western Canadian coal producers will take place some time prior to those dates.

Several private and/or public sector initiatives are presently underway which are aimed at improving the domestic and international marketability of western coal. These are briefly reviewed in Annex "A".

Activities of the Secretariat

The Secretariat met on March 11, April 27, July 3, July 24 and August 31, 1987. The Secretariat or certain of its members also met with or received comments and suggestions from representatives of certain coal companies, The Coal Association of Canada, the Canadian railways, Thunder Bay Terminals Ltd., Canadian shipping associations and unions associated with both coal production and transportation.

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The Secretariat reviewed the reports of earlier task forces and other relevant documents, and has concluded that there is potential to expand western Canadian coal sales in Ontario in the long term on a commercial basis. Additional sales can be supported by co-operative efforts to reduce transportation charges, to lower coal production costs, to improve and demonstrate western coal quality and to show the impact of these efforts on the commercial viability of western coal sales to Ontario.

The Secretariat identified possible technological, commercial, regulatory and policy options which can impact on the delivered cost to Ontario. It assessed the significance of each in terms of its potential impact, implementation, cost and timing. It then selected the most promising of those which are likely to enhance the role of western Canadian coal in Ontario, and identified the tasks and actions required to be able to demonstrate conclusively to Ontario Hydro and other users of this coal in Ontario the potential competitiveness of western Canadian coal in that province.

The Secretariat is pleased to report that coal producers, shippers, and Ontario Hydro are working to develop western Canada's coal sales potential and are unanimous in their belief that western coal will play a larger role in meeting Ontario's energy requirements. They indicate that government subsidy is not needed to achieve the objectives of the western coal initiative.

Based on its in-depth review of the available information, the Secretariat agrees with the private sector perspective on this issue. Ontario Hydro's recent purchase of an additional 1.0 million tons of western coal attests to the potential longer term competitiveness of this product.

Recommendations

The roles suggested for government are to maintain and further improve fiscal and regulatory systems for the coal and transportation sectors, and to continue to foster technical progress through support for basic and applied generic research, development and precommercial demonstration.

Although the private sector can and must take the lead role, the Secretariat has, in conjunction with industry, identified a number of research and development initiatives which can be pursued cooperatively and which can usefully complement existing activities. These all require government support to accelerate their development

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to demonstrate to Ontario Hydro, when finalizing its proposed emmission control strategy in January, 1989, that these promising initiatives can become a commercial reality by 1992. In addition to its concerns about western Canadian coal for Ontario Hydro, the Secretariat also noted that these initiatives will serve to develop or expand demand for these coals in Ontario's steel, general industrial and institutional markets, as well as providing significant assistance in international markets.

The recommended initiatives are described in Annex "B". The Secretariat recommends government support for the initiatives because:

1. They offer reasonable potential to reduce the delivered cost of western Canadian coal to Ontario and the probability of success in the near term is relatively high.

2. There is evidence of the broad applicability of their findings within the coal and/or transportation industries,

3. They are supported by one or more elements of the private sector.

The Secretariat estimates that the overall costs of these initiatives over the next four years are as follows:

$10-15 million for research and development;
$70-80 million for precommercial demonstration, the latter depending on the outcome of research and development activities. The cost of commercialization of these technologies, which will be the sole responsibility of the private sector, is not included in these calculations.

Most of the specific projects within the generic intiatives will depend on the support, participation and shared financing by individual organizations in the private sector for their implementation. However, while it is understood that such cooperation by the private sector will be forthcoming, it is considered unreasonable to expect firm financial commitments from either governments or individual companies until the necessary strategies, work plans and budgets for each project have been negotiated. It is considered essential, however, that there be appropriate private sector participation in each project, as a condition of the project being implemented.

The Secretariat makes the following recommendations to the Action Committee:

a) that the Action Committee acknowledge the private sector role in expanding western coal sales to Ontario, and indicate its confidence that these private sector efforts will ultimately prove successful;

b) that the recommended initiatives and their projects be approved in principle and that the five governments agree to begin negotiations on individual projects;

c) that the identified lead government for each project be granted approval in principle to initiate negotiations between governments and industry. Specific cost shared proposals can then be prepared and presented for individual government approval in line with the existing policies and procedures of respective governments. Upon obtaining approval, a Steering Committee comprising representatives of the funding partners will be responsible for managing the individual projects; and

d) that the Secretariat be continued, to monitor progress and submit reports to the Action Committee as required.

Dan McFadyen

I. Bruce MacOdrum

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Major Activities Already Under Way

Major activities already under way by the private sector, in some cases jointly with governments, or by government intended to improve the marketability of western coal in both domestic and international markets are described below:

1. CN Rail and CP Rail are already undertaking research, development and demonstration programs related to the design and operation of unit coal trains and other activities, with a view to their increased efficiency and economics. These include such items as the design of high efficiency coal cars, advanced train control and rail lubrication systems.

2. The Alberta Research Council/Electric Power Research Institute (U.S.A.) agglomeration project will demonstrate at the pilot scale a coal-oil agglomeration process. This work will cost $3.3 million over the next 2½ to 3 years, and commercialization may follow with the construction cost of a $82 million process plant.

3. Gulf Canada's coal beneficiation process for upgrading the energy content of low rank coals and making them suitable for long distance transportation. Demonstration programs will be complete late in 1987, at a cost of $6 million, to be followed by the construction and operation of a commercial demonstration unit at a cost of $10 million.

4. Under the scope of the Canada/Germany S&T Consultation agreements, the two countries are cooperating in assessing coal water fuel technology as a solution to Canada's high inland transportation costs by transporting the product in existing oil pipelines. Germany will investigate the process parameters associated with producing coal water fuels from several Canadian coals, and determine the pipeline transport options of these fuels. Canada will be evaluating the overall economic and combustion characteristics of the fuels. This phase will require 14 months, at a cost of $2 million.

5. Two projects to improve coal handling and combustion technology are being undertaken in British Columbia, both involving Kootenay reject coal fines agglomeration. Partial funding for these projects is being provided through the Canada-British Columbia Mineral Development Agreement.

6. The Alberta government has decided to pursue idependently the new improved unit train design concept, as identified by National Steel Car Ltd.

PROPOSAL SUMMARY SHEET

ANNEX "B"

Project Number	Project Title	Lead Role	Costs Research and Development	Costs Precommercial Demonstration	Total	Time Frame	Potential Impact on Competitiveness of Western Coal to Ontario
	A. Mine Productivity Improvements						
A-1	In-Pit Crushing and Conveying in Western Surface Coal Mines	Alberta	250 000	12 000 000	12 250 000	2-4 years	up to $1.00/tonne
A-2	Underground Thick Seam Extraction Using Room and Pillar System of Mining	Alberta	250 000	14 870 000	15 120 000	3 years	up to $2.90/tonne
A-3	Process Automation	British Columbia	200 000	4 000 000	4 200 000	2-3 years	up to $0.50/tonne
	B. Coal Product Improvements						
B-1	Ash Reduction, Refuse Reprocessing and Fines Processing	Alberta	1 200 000	9 500 000	10 700 000	2-4 years	up to $0.50/tonne significantly improved environmental impact significantly increased resource base
B-2	Coal Blending to Meet User Specifications	British Columbia	2 000 000	n/a	2 000 000	2-3 years	significantly increased potential demand
B-3	Low Rank Coal Upgrading	Saskatchewan	1 300 000	9 000 000	10 300 000	3 years	commercial plant to produce product competitive in price and quality with higher rank U.S. coals
B-4	Coal-Oil Agglomeration	British Columbia	1 300 000	6 100 000	7 400 000	2-3 years	significantly increased potential market and increased coal yield of 10%
	C. Transportation Improvements						
C-1	Rail Efficiencies and Overhead Burdens	Canada	in-house	-	-	3 months	lower cost of moving coal
C-2	Thunder Bay Terminal Operations	Ontario	75 000	n/a	75 000	6 months	economies of scale
C-3	Laker Transportation	Ontario	75 000	n/a	75 000	6 months	economies of scale
C-4	Panama Routing	British Columbia	in-house	n/a	0	4 months	possible lower transportation costs
C-5	Coal-Oil Mixture Slurry Transportation Concept	Alberta	4 500 000	15 000 000	19 500 000	3 years	$10 to $15/tonne
	D. Fiscal and Regulatory Improvements						
D-1	Taxes and Regulatory Costs on Rail and Pipeline Traffic	Ontario	50 000	n/a	50 000	4 months	to be determined
D-2	Taxes and Regulatory Costs on Coal Producers	The Coal Association of Canada	in-house	n/a	0	4 months	to be determined
	TOTAL		**11 200 000**	**70 470 000**	**81 670 000**		

A. MINE PRODUCTIVITY IMPROVEMENTS

PROJECT NO. A-1 **LEAD ROLE: ALBERTA**

PROJECT TITLE: In-Pit Crushing and Conveying

OBJECTIVE:

To evaluate and demonstrate existing in-pit crushing and conveying technologies for waste removal at western Canadian surface coal mines.

DESCRIPTION:

The excavation and removal of waste rock and overburden is the largest component of the mining cost of western Canadian coal. Recent experience with in-pit crushing and conveying in metalliferous mines has been favourable and suggests that, with modifications, such technology could significantly reduce waste material removal costs at western Canadian surface coal mines in the short term.

Phase 1 - Technical and economic feasibility studies of in-pit crushing and conveying material handling schemes.

Phase 2 - Detailed technical and economic feasibility of the leading candidate material handling scheme.

Phase 3 - Demonstration and evaluation of the leading candidate waste rock and overburden material handling scheme.

COST AND TIMING:

Phase 1 -	$100 000	3 months
Phase 2 -	$150 000	2 months
Phase 3 -	$12 million	2 to 4 years

POTENTIAL BENEFITS:

Potential cost savings in the delivered price of coal range from $0.10 to $1.00 per tonne with successful completion of this project. Benefits are highly site specific, but almost all surface mines can benefit to some degree.

A. MINE PRODUCTIVITY IMPROVEMENTS

PROJECT NO. A-2 **LEAD ROLE: ALBERTA**

PROJECT TITLE: Underground Thick Seam Extraction Utilizing Room and Pillar System of Mining

OBJECTIVE:

To demonstrate full seam development and extraction of a 20 foot thick coal seam by an innovative underground mining method.

DESCRIPTION:

Considerable reserves of high quality coal are present in seams over twelve feet thick in western Canada. Resource recovery from underground mines is severely limited by the physical constraints of current equipment and mining systems. A unique opportunity exists to develop and demonstrate Canadian capability in advanced resource technologies through an innovative mining system which will enable full extraction of coal seams ranging from 12 to 20 feet thick. The mining system will utilize a state-of-the-art high reach continuous miner cutting and loading machine in combination with a roof and side support machine, mechanized gob-edge support and a flexible conveyor train (FCT).

The FCT is an endless conveyor belt which is capable of conveying coal around numerous changes of direction and gradient without transferring the coal until it arrives at the end of the system, where it is delivered onto the mine conveyor system. No persons are required between the receiving and delivery ends of the system.

In addition to the demonstration, research is required in: roadway behaviour, rock mechanics, strata control, pillar behaviour, ventilation, mine equipment design and modification.

The project would be phased over a six year period. The mining system would demonstrate each machine in combination with the others in an engineered and phased approach prior to commercial use.

Phase 1 - Demonstrate roof and side support machine.

Phase 2 - Demonstrate continuous haulage.

Phase 3 - Demonstrate thick seam continuous mining.

Phase 4 - Demonstrate mobile gob-edge supports.

Phase 5 - Research report on rock mechanics and strata behaviour.

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Project No. A-2 Continued . . .

COST AND TIMING:

Phase 1	-	$ 5 620 000	1 year
Phase 2	-	$ 6 000 000	2 years
Phases 3 4 and 5	-	$ 3 500 000	3 years
Total		$15 120 000	

POTENTIAL BENEFITS:

Potential benefits for this project amount to $2.90 per tonne which is equivalent to a 22% reduction in operating expense.

A. MINE PRODUCTIVITY IMPROVEMENTS

PROJECT NO. A-3 **LEAD ROLE: BRITISH COLUMBIA**

PROJECT TITLE: Process Automation

OBJECTIVE:

To increase the recovery of saleable product from western Canadian coal and processing plants and reduce product cost and waste disposal cost.

DESCRIPTION:

On-line analysis of raw, semi-finished and final coal product combined with real-time computation, comparison and decision-making computer ability has barely been started in the coal processing industry. Sensor and feed-back loop response time is much too slow for true automatic control.

Phase 1 - Select a process plant with spare capacity circuits and design automated control for all possible steps in its process.

Phase 2 - Demonstrate selected process controls at the precommercial scale.

COST AND TIMING:

Phase 1 - $ 200 000 4 to 8 months

Phase 2 - $ 4 million 2 to 3 years

Timing and cost are dependent upon the size and sophistication of the selected plant, the degree of process automation chosen, and the magnitude of plant refitting and capital equipment required.

POTENTIAL BENEFITS:

Potential benefits are a reduction in processing and waste disposal cost amounting to $0.10 to $0.50 per tonne. Although these cost savings may appear small in relation to total production costs, they represent a large proportion of processing costs.

B. COAL PRODUCT IMPROVEMENTS

PROJECT NO. B-1 **LEAD ROLE: ALBERTA**

PROJECT TITLE: Ash Reduction, Refuse Reprocessing and Fines Processing

The objectives, descriptions, costs, timing and potential benefits of this 3-part generic initiative are attached.

COST AND TIMING:

	Ash Reduction	Refuse Reprocessing	Fines Processing	Total
Pre-demonstration	-	700 000	500 000	1 200 000
Demonstration	$5 000 000	3 000 000	1 500 000	9 500 000
Total	$5 000 000	3 700 000	2 000 000	10 700 000

Two to four years

POTENTIAL BENEFITS:

Up to $0.50/tonne; significantly improved environmental impact; significantly increased resource base.

PROJECT NO. B-1(1)

PROJECT TITLE: Ash Reduction

OBJECTIVE:

To reduce the ash content of western Canadian clean coals in response to the client-driven need, and to increase the value of these stable low cost domestic resources in both domestic and international markets.

DESCRIPTION:

As now produced, the combination of process plant performance and economics dictates that clean coals from western Canadian bituminous coal mines have higher ash contents than many of the coal with which they compete, either in international or Canadian trade. These ash contents impose penalties in terms of heat-content, transportation unit-cost, and ash disposal costs to the consumer.

Aside from agglomeration processes, there are several initiatives which should be examined to improve the performance of existing process plants. These are:

(a) On-Line Analysis

Variations in coal quality either fed to or within the plant need to be monitored on a real-time basis. Such instrumentation is available, but needs to be evaluated and calibrated.

(b) Process Automation

To make full use of on-line analyses, a link between this and fine tuning of each element in the process circuit needs to be established, such that the equipment is adjusted automatically to work at its optimum on a continuous basis. This will not duplicate the activities under Project A-3.

(c) Plant Feed Blending

A corollary to process automation is control of the raw coal blend or blends fed to the plant. Again, on-line analysis and methodologies of controlling plant feed quality will optimize plant performance.

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Ash Reduction continued . . . .

COST AND TIMING:

This project could include none, part or all of, but not duplicate process automation and fines processing projects, in addition to the plant feed blending.

In some plants, feed blending is already in place (i.e. zero capital cost of facilities) while in other plants blending would demand a complete front end rebuild.

The cost of this project is very variable for the above reasons.

- $5 million 1 to 4 years

POTENTIAL BENEFITS

Improve the marketability of western Canadian coals in domestic and international markets and at the same time reduce the delivered cost of coal by $0.50 per tonne for every percentage point of ash reduction achieved.

PROJECT NO. B-1(2)

PROJECT TITLE: Refuse Reprocessing

OBJECTIVE:

To recover saleable coal from accumulated refuse sources at western Canadian coal mines.

DESCRIPTION:

Large quantities of tailings have been produced in western Canada over the last 20 years. These are generally associated with operating coal preparation plants. Most of the coal found in these tailings is due to the high amounts of fines in the run-of-mine coal and the associated difficulty in achieving efficient separation of these fine particles. Recovery of this lost coal would improve resource recovery, extend the life of existing tailings ponds and reduce environmental problems associated with the presence of coal in tailings ponds.

A number of unproven fine coal recovery processes have been developed or are being developed in the laboratory. The performance of those processes on coal fines, which over time in the tailings ponds will have altered surface properties, is unproven.

Phase 1 - Technical and economic feasibility of various candidate refuse coal recovery technologies.

Phase 2 - Pilot scale evaluation of the leading candidate refuse coal technology recovery.

Phase 3 - Detailed technical and economic feasibility of the leading candidate refuse coal recovery technology.

Phase 4 - Precommercial demonstration and evaluation of the leading candidate refuse coal recovery technology.

NOTE: Variability in feed (coal content, surface properties and the like) may demand real time process control which may need to be addressed in this program.

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Refuse Reprocessing continued . . .

COST AND TIMING:

Phase 1 - up to $300 000
- includes costs of core-drilling and analysis to define recoverable resource size/geometry/variations, etc.

Phase 2 - $250 000, 6 months
- could be less if selected process has been extensively pilot scale tested.

Phase 3 - $150 000, 2 months

Phase 4 - $3 million, 2 to 3 years
- timing and cost are dependent upon chosen technology, need for process automation and magnitude of required capital purchases.

POTENTIAL BENEFITS:

Significantly increased resource base of marketable western Canadian coal at very low cost.

PROJECT NO. B-1(3)

PROJECT TITLE: Fines Processing

DESCRIPTION:

To reduce fine coal losses in western Canadian coal preparation plants.

OBJECTIVE:

Western Canadian coals are friable resulting in high levels of run-of-mine fines. The fine coal circuits in western Canadian coal preparation plants are overloaded by comparison with those of other producing countries. The magnitude of fines coupled with the inherent difficulties in achieving efficient separation of fine particles results in an inefficient fine coal cleaning system with high fine coal losses to the refuse streams.

A number of unproven fine coal treatment processes have been developed in the laboratory/pilot plant environment. None of these candidate processes have been precommercially demonstrated.

Phase 1 - Technical and economic feasibility of various candidate fines processing technologies.

Phase 2 - Pilot scale evaluation of the leading candidate fines processing technology.

Phase 3 - Detailed technical and economic feasibility of the leading candidate fines processing technology.

Phase 4 - Precommercial demonstration and evaluation of the leading candidate fines processing technology.

NOTE: The leading candidate fines processing technology may demand real time process control. If that is the case, deficiencies in current process stream sensors and process control logic must be addressed as part of this program although process automation is the subject of a separate proposal.

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Fines Processing continued . . .

COST AND TIMING:

Phase 1 -	$ 100 000	3 months
Phase 2 -	$ 250 000	6 months
	- Could be less if the selected process has already been pilot scale tested.	
Phase 3 -	$ 150 000	3 months
Phase 4 -	$1.5 million	2 to 3 years
	- Timing and cost are dependent on the chosen technology and its need for process automation and extent of capital equipment purchase.	

POTENTIAL BENEFITS:

Significantly improved recovery of saleable coal and reduced cost of waste disposal, plus decreased negative environmental impacts.

B. COAL PRODUCT IMPROVEMENTS

PROJECT NO. B-2 **LEAD ROLE: BRITISH COLUMBIA**

PROJECT TITLE: Coal Blending to Meet User Specifications

OBJECTIVE:

To assess the potential impact in terms of user acceptance of blending western Canadian thermal coals to meet Ontario and other potential customer specifications.

DESCRIPTION:

Western Canada produces a wide range of coals that could, with blending, find greater user acceptance by tailoring product specifications to meet market requirements. This generic study would analyse the effect of blending on coal quality before and after coal preparation and upgrading.

Phase I - Examine a series of coals and potential blends to determine:

(a) the relevant coal quality criteria;
(b) whether these properties are additive or whether interactions between various maceral and mineral elements in the coals result in non-linear relationships.

Phase 2 - Pilot plant beneficiation and upgrading of selected coal blends.

Phase 3 - Combustion tests of coal blends to determine flame stability, carbon burnout, and fouling and fly ash resistivity properties of ash.

COST AND TIMING:

$ 2 million 2 to 3 years

POTENTIAL BENEFITS:

Significantly increased potential demand for western Canadian coals.

B. COAL PRODUCT IMPROVEMENTS

PROJECT NO. B-3 **LEAD ROLE: SASKATCHEWAN**

PROJECT TITLE: Low-Rank Coal Upgrading

OBJECTIVE:

To identify market opportunities and evaluate promising upgrading processes for the commercialization of high-grade solid fuels prepared from western Canada's inexpensive and plentiful sub-bituminous and lignite coals.

DESCRIPTION:

While western Canada's low-rank coals are inexpensive to produce, their high moisture and ash content limit their potential for export to Ontario. Several processes have been identified to remove moisture and improve burning characteristics of low-rank coals which would improve the competitiveness of these coals in Ontario thermal coal markets.

In Phase 1, marketing and technology evaluation studies will be carried out to identify the most promising upgrading processes, both technically and economically. In Phase 2, the most promising of these technologies would be advanced to the pilot plant stage to demonstrate the commercialization potential.

COST AND TIMING:

Phase 1 - $ 1 300 000 1 to 2 years

Phase 2 - $ 9 million 2 years

POTENTIAL BENEFITS:

The probability of successful demonstration of the production of an upgraded solid fuel product which is competitive in price and quality with higher rank U.S. coals is viewed as relatively high. Successful demonstration could lead to commercialization at a 5 mtpy plant with a capital cost at some $300 million.

B. COAL PRODUCT IMPROVEMENTS

PROJECT NO. B-4 **LEAD ROLE: BRITISH COLUMBIA**

PROJECT TITLE: Improved Handling and Combustion Characteristics for Metallurgical and Blended Thermal Coals

DESCRIPTION:

For metallurgical coal, agglomeration provides a clean product with better flow, which is easy to pulverize, having reduced fines carry-over into off-gasses, higher coke yields and increased coke stability.

For blended thermal coals and reject fines, agglomeration improves combustion and handling characteristics. In particular, the agglomeration of reject coal fines may produce a marketable thermal fuel at a price substantially below the cost of coal production.

Phase 1 - Laboratory tests and analysis of results; pilot plant tests and economic evaluation; burn tests on thermal coal blends.

Phase 2 - Pilot plant tests and analysis of results, engineering design for precommercial demonstration. Economic evaluation and reports.

Phase 3 - Precommercial demonstration

COST AND TIMING:

Phase 1 -	$ 500 000	6 months
Phase 2 -	$ 800 000	6 months
Phase 3 -	$6 100 000	2 years
Total	$7 400 000	

POTENTIAL BENEFITS:

Increase clean coal yield by 10%; significantly increased potential markets.

C. TRANSPORTATION IMPROVEMENTS

PROJECT NO. C-1 **LEAD ROLE: CANADA**

PROJECT TITLE: Railway Efficiencies and Overhead Burdens

OBJECTIVE:

The objective of this initiative is to identify and quantify the major items constituting overhead burdens for coal movements and to compare these with those carried by U.S. railways.

DESCRIPTION:

Both the reduction of overhead burdens and variable rail costs would give the Canadian railways more flexibility to provide competitive rates.

There is evidence to suggest that Canadian railways generally have lower variable costs than U.S. railroads, but to maintain this advantage it is important to incorporate physical plant and technical developments into rail operations. Both railway companies already are actively pursuing such technological improvements as described in Annex "A". This will continue to be monitored by the Secretariat.

Overhead burdens for Canadian railways appear to be greater than those of the U.S. railroads; and some of the items constituting these burdens are associated with rationalization and operations. This project would list these burdens, compare them to those of the U.S. and make recommendations for their elimination or reduction, where possible.

COST AND TIMING:

In-house 6 months

POTENTIAL BENEFITS:

As decided by governments.

C. TRANSPORTATION IMPROVEMENTS

PROJECT NO. C-2 **LEAD ROLE: ONTARIO**

PROJECT TITLE: Thunder Bay Terminal Operations

OBJECTIVE:

A. To determine probable terminal throughout charges on 5, 8 and 10 million tonnes based on various costing approaches.

To identify probable capital and operating costs of expanding coal storage capacity from current 1.5 million tonnes to 2.0 and 2.5 million tonnes, to avoid rail service disruptions during winter closure of the Great Lakes/St. Lawrence Seaway.

To identify probable capital and operating costs of extending the docks at Thunder Bay Terminal, Nanticcke and Lakeview from 750 to 1,000 feet, to accommodate maximum size lake vessels.

B. To determine the technical and economic feasibility of the blending of western coals at Thunder Bay Terminal.

C. To identify and evaluate competition for access to the terminals from other bulk commodities.

D. To compare the probable terminal throughput charges at Duluth, Minnesota on 5, 8 and 10 million tonnes using the same costing approaches as employed in A. above.

COST AND TIMING:

Independent Consultant: 4 to 6 months
$50,000 to $75,000

POTENTIAL BENEFITS:

Economies of scale.

C. TRANSPORTATION IMPROVEMENTS

PROJECT NO. C-3 **LEAD ROLE: ONTARIO**

PROJECT TITLE: Laker Transportation

OBJECTIVE:

- To establish laker capacity and requirements under various volume and routing scenarios.

- To compare above relative to existing fleet, including 1,000 ft. vessels.

- To estimate how and at what costs shortfalls can be covered.

- To determine probable laker costs and rates bases on:

    - higher volumes
    - dedicated service
    - 1,000 ft. vessels
    - integral services with combinations of backhauls including northbound coal and/or U.S.A. iron ore.

COST AND TIMING:

Independent Consultant: 4 to 6 months
$50,000 to $75,000

POTENTIAL BENEFITS:

Economies of scale.

C. TRANSPORTATION IMPROVEMENTS

PROJECT NO. C-4 **LEAD ROLE: BRITISH COLUMBIA**

PROJECT TITLE: Panama Routing

OBJECTIVE:

To determine whether British Columbia and Alberta coal can be delivered to Ontario via a Panama routing at competitive prices.

DESCRIPTION:

1. Develop a range of estimates for rail rates to Vancouver for existing car designs.

2. Develop cost estimates for storage and handling of coal at Vancouver terminals, assuming volumes of up to 10 million tonnes per year.

3. Develop cost estimates for shipping from Vancouver to Ontario Hydro plants, including the cost of transfer from Panamax vessels to lake vessels.

NOTE: The proposed program does not include cost estimates for blending of Vancouver Island coal at Roberts Bank. Initial work by Island producers suggests there are less expensive ways of blending (eg. at the point of transfer from Panamax to lake vessel).

COST AND TIMING:

In-house	completion four months from commencement of work

POTENTIAL BENEFITS:

Possible lower transportation costs.

C. TRANSPORTATION IMPROVEMENTS

PROJECT NO. C-5 **LEAD ROLE: ALBERTA**

PROJECT TITLE: Coal-Oil Mixture, Slurry Transportation Concept

OBJECTIVE:

To evaluate the feasibility and demonstrate the applicability of transporting agglomerated coal as a coal-oil slurry in existing crude oil or gas pipelines and to develop the necessary process technologies to prepare the slurry and to separate the delivered slurry into a coal product and a refinable oil product.

DESCRIPTION:

Transportation is the single largest component of the delivered cost of western Canadian coal to Ontario. Pipeline transportation is a fraction of the cost per ton as rail. It is proposed to determine the technical feasibility of delivering coal to Ontario via an existing pipeline. The study will evaluate the preparation, pipelining, separation and utilization of the coal and oil. Use of agglomerated coal will be evaluated as part of the separation and utilization aspect. Part of the study would be the development of the necessary process technologies.

The investigation will include evaluation of available pipeline systems and the cost to access them. Both batch operation and segregated operation will be evaluated for oil lines. Gas pipelines will be evaluated to determine if spare capacity exists, particularly in the summer, and the technology required to access them. Since this proposal would require some restructuring of the existing pipeline system in Canada, it is likely that the federal government would participate in consideration of system options and operations.

Phase 1 - Laboratory studies, a pipe loop test and more detailed pipeline system studies.

Phase 2 - Construction and operation of a pilot plant (preparation, transportation and separation), combustion and refining tests.

Phase 3 - Construction and operation of a demonstration plant capable of handling commercial quantities and pipeline tests of a sufficient size to demonstrate commerciality.

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Coal-Oil Mixture, Slurry Transportation Concept continued . . .

COST AND TIMING:

Phase 1 - $ 1.5 MM,	1 year
Phase 2 - $ 1.8 - 3.0 MM,	1 year
Phase 3 - $15 MM,	1 year

POTENTIAL BENEFITS

Dependent on quantities, transportation savings of $10-15/tonne might be realized.

D. FISCAL AND REGULATORY IMPROVEMENTS

PROJECT NO. D-1 **LEAD ROLE: ONTARIO**

PROJECT TITLE: Taxes and Regulatory Costs on Rail and Pipeline Traffic

OBJECTIVE:

1. To identify and describe taxes paid by rail and pipeline jurisdictions as they affect rail and pipeline movements and carriers.

2. Describe each tax and how it is applied by each jurisdiction.

3. Determine the cost to the carriers of each tax.

COST AND TIMING:

Independent Consultant: 6 months
$50,000

POTENTIAL BENEFITS:

As decided by governments

D. FISCAL AND REGULATORY IMPROVEMENTS

PROJECT NO. D-2 **LEAD ROLE: THE COAL ASSOCIATION OF CANADA**

PROJECT TITLE: Taxes and Regulatory Costs on Coal Producers

OBJECTIVE:

To identify and describe the taxes paid and regulatory costs incurred by coal producers and to determine their financial magnitude in relation to movement of western coal to Ontario.

DESCRIPTION:

1. Compile a list of taxes and regulations in federal and provincial jurisdictions as they affect coal producers in relation to coal sales to Ontario.

2. Describe each tax/regulation and how it is applied by each jurisdiction.

3. Determine the cost to coal producers of each tax/regulation.

COST AND TIMING

In-house	completion four months from commencement of work

POTENTIAL BENEFITS:

As decided by governments